California Regional Water Quality Control Board

Central Coast Region

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Linda S. Adams
Secretary for Environmental Protection

Arnold Schwarzenegger
Governor

May 9, 2007

Mr. Curt Richards
Olin Corporation
Environmental Remediation Group
P.O. Box 248
Charleston, TN 37310-0248

Dear Mr. Richards:

SITE CLEANUP PROGRAM: 425 TENNANT AVENUE, MORGAN HILL; RESPONSE TO OLIN'S 2006 LLAGAS SUBBASIN CHARACTERIZATION REPORT

Central Coast Regional Water Quality Control Board staff reviewed the January 31, 2007, "Llagas Subbasin Characterization - 2006, Santa Clara County, Olin/Standard Fusee, Morgan Hill, California" (2006 Characterization Report), submitted by MACTEC Engineering and Consulting, Inc. on Olin Corporation's behalf. Olin submitted the 2006 Characterization Report in accordance with Ordering Paragraph D. of Cleanup or Abatement Order No. R3-2005-0014 (Cleanup Order) issued on March 10, 2005.

The 2006 Characterization Report presents an evaluation of data collected in 2006 and updates the first Characterization Report that Olin submitted on March 29, 2006, which included an evaluation of all the data collected up to and including 2005. The objectives of the 2006 Characterization Report are to:

1. Evaluate additional hydrogeologic and perchlorate data collected in 2006,
2. Evaluate the monitoring system performance in 2006,
3. Evaluate and recommend changes based on the revised hydrogeologic conceptual model.

Water Board staff appreciates the significant effort that Olin and its consultants put forth to prepare the 2006 Characterization Report. We value the technical excellence of the 2006 Characterization Report and the detailed investigations conducted to refine the conceptual hydrogeologic model of the Llagas Subbasin. In general, Water Board staff concurs with the refined conceptual hydrogeologic model for the Llagas Subbasin and supports Olin's proposed additional characterization activities to completely delineate the lateral and vertical extent of perchlorate impacts throughout the Llagas Subbasin.

After our review of the 2006 Characterization Report and our technical discussions of the report at our meeting on February 27, 2007, we have the following comments:

PERCHLORATE INVESTIGATION NORTHEAST OF THE OLIN SITE

Background: In Section 8.0 of the 2006 Characterization Report, Olin presents the results of additional perchlorate sampling and investigation in the area northeast of the Olin site. Olin reports perchlorate concentrations between 2.0 micrograms per liter (µg/L) and 4.6 µg/L from several private water supply wells northeast of the Olin site. In addition to Olin's data, the City of Morgan Hill provided historical trace concentration data from all of its municipal water supply wells. The additional data confirm the presence of low levels of perchlorate in municipal and private water supply wells located as far as three miles northeast of the site. Olin asserts that these new data suggest the presence of an anthropogenic source(s) other than Olin.

Water Board Response: We agree that the new data support Olin's contention that detectable perchlorate concentrations in groundwater north and northeast of the Olin site may be attributable to other source(s). However, Resolution No. 92-49 requires that all cleanup or abatement actions conform to the provisions of State Water Board Resolution No. 68-16 (Anti-Degradation Policy) and to applicable provisions of Title 27 or Title 23, Chapter 15, California Code of Regulations. Therefore, the background concentration of perchlorate in groundwater within the Llagas Subbasin is the level of perchlorate that would exist in groundwater without regard to any discharges from the former Olin site[1]. Until Olin confirms the origin, extent, and degree of contribution of the recent perchlorate detections, we must continue to assume that the background perchlorate level in groundwater (for the majority of the Llagas Subbasin) is less than the method detection limit.

Forensic Chemistry Study: The Santa Clara Valley Water District (Water District) is conducting a forensic chemistry study to determine if there are background concentrations of perchlorate and other sources of perchlorate in the Llagas Subbasin. The study will attempt to distinguish different anthropogenic sources of perchlorate. Water Board staff believes that the forensic chemistry study is the best tool available to identify perchlorate sources other than the Olin Site that may have impacted groundwater in the Llagas Subbasin. Water Board staff anticipates that results may be available for review at the end of this year or early next year.

Until the results of the forensic chemistry study are available, Water Board staff believes it is pertinent to focus on the remediation efforts of the plume core. At this time, Water Board staff will not determine what the background concentration of perchlorate is in the Llagas Subbasin or require Olin to conduct additional background evaluations, until the results of the Water District's study are available for review. In the meantime, Olin and Water Board staff will continue to evaluate perchlorate concentrations from private water supply wells to ensure that the public has an alternative water supply if concentrations of perchlorate exceed 6.0 µg/L in groundwater collected from their domestic supply wells.

[1] In the case of commingled plumes from multiple dischargers, background is determined without regard to the commingled discharges.

DELINEATION OF THE DEEP AQUIFER

Olin has not completed delineation of the lateral and vertical extent of perchlorate in the deep aquifer. However, characterization activities of perchlorate in the deep aquifer are ongoing and proposed as described in Section 10.0 of the 2006 Characterization Report. Water Board staff concurs with the proposed recommendations outlined in Section 10.2 of the 2006 Characterization Report for additional investigation of perchlorate, nitrate, and perchlorate attenuation processes in the deep aquifer.

1. Identified Data Gaps in the Deep Aquifer

We agree that continued plume characterization is necessary and appropriate to fully characterize the extent and degree of groundwater impacts within the highest concentration area (Area I), particularly within the deep aquifer zone. Water Board staff identified three areas where Olin has not completed delineation of perchlorate in the deep aquifer and where Olin has not proposed additional investigation to evaluate and delineate perchlorate in these areas. The three areas where Water Board staff identified data gaps are as follows:

- *Area South of MW-16, MW-17, MW-52, and MW-53*:

  Background: Olin has not delineated perchlorate in the area south of the site beyond existing wells MW-52, MW-16, MW-17, and MW-53. Based on Figure 7.6 of the 2006 Characterization Report, the plume core extends south of wells MW-52, MW-16, MW-17, and MW-53. However, the closest well screened in the deep aquifer south of these wells is MW-21, which is approximately 4,500 feet away.

  Water Board Response: Characterization activities should include at least one additional multi-level well between MW-17 and MW-21. The data gap in the deep aquifer between these two wells is too large. A deep monitoring between these two well locations will help define the southern extent of the plume core within the deep aquifer zone.

  We encourage you to expedite characterization activities of the plume core in the deep aquifer zone south of MW-17. As discussed in our March 29, 2007 response letter to the Revised Cleanup Feasibility Study Report, if the plume core in this area extends further south in the deep aquifer, Olin will need to re-evaluate the efficacy of the proposed extraction system. Olin may need to modify the proposed extraction system (e.g., the addition of an extraction well, increasing the extraction capacity, etc.,), if the plume core extends further south from MW-17. A deep monitoring well between MW-17 and MW-21 will not only help define the southern extent of the plume core within the deep aquifer zone but this well will potentially be an ideal candidate to serve as a performance monitoring well (for remediation progress monitoring).

- *Area West of Olin Site and MW-53:*

  Background: Olin has not completed delineation of the plume core[2] within the deep aquifer zone west of the area between the site and well MW-53. Olin collected a grab groundwater sample from CPT-55 (approximately 350 feet west of MW-53) and reported a perchlorate concentrations of 25 µg/L at 197 feet below ground surface, in the upper deep aquifer, at this location. We understand that there are property access issues associated with this area and that a bedrock outcrop exists further west of this area.

  Water Board Response: We encourage Olin to proceed with obtaining access for well placement (or CPT boring if the desired depth can be obtained) in this area so that Olin can delineate perchlorate in the deep aquifer west of MW-53.

- *Area Southeast of the Olin Site and between PZ-05 and MW-52:*

  Background: Another area where Olin has not delineated the plume core in the deep aquifer zone southeast of the site between PZ-05 and MW-52. In Section 10.2.1 of the 2006 Characterization Report and as shown on Figure 10.2, Olin recommends installation of MW-55. MW-55 is located approximately 1,500 feet east of MW-52.

  Water Board Response: We concur with Olin's phased approach, which includes evaluating perchlorate data collected from MW-55 prior to installing another well in the area southeast of the site and between PZ-05 and MW-52. Therefore, based on the information obtained from MW-55, additional delineation of the area southeast of the site and between PZ-05 may be required in the future.

2. Work Plan for Additional Characterization Activities

Background: In accordance with our March 29, 2007 letter concerning Olin's Revised Cleanup Feasibility Study Report, Olin is required to provide a work plan that outlines Olin's plans for additional characterization activities within the deep aquifer zone to delineate the plume core in Area I. The Deep Aquifer Characterization Work Plan is requested as an addendum to the Site-wide Cleanup Work Plan.

Water Board Response: By **June 15, 2007**, Olin is required to prepare and submit a Deep Aquifer Characterization Work Plan. Olin may submit the work plan separate from the Site-wide Cleanup Work Plan. The Deep Aquifer Characterization Work Plan must address:

- the proposed locations of new wells,
- proposed screen locations,
- a proposed time schedule for well installation,

[2] Groundwater with perchlorate concentrations greater than 24.5 micrograms per liter

- a proposed schedule for data reporting related to the characterization activities,
- an explanation of Olin's phased approach (e.g., proposed sequence for installing each well and what data will be evaluated prior to installing subsequent wells), and
- an explanation of Olin's process for evaluating the efficacy of the proposed groundwater remediation system and how Olin will address remediation system modifications if additional characterization activities indicate that the plume core is larger than originally anticipated.

We recommend that Olin include a "Characterization Progress Report" section to summarize the results and discuss upcoming work of the ongoing characterization activities in each upcoming quarterly monitoring report. Olin should also continue to provide a detailed summary of all the additional characterization activities in future updates to the Characterization Report.

3. Area Northeast of Olin Site between PZ-01 and PZ-02

Water Board staff concurs with Olin's approach to evaluate data from PZ-05 prior to installation of proposed deep well PZ-06. Olin reports detections of perchlorate in the deep aquifer at the PZ-03 location above 5.0 µg/L. To continue to evaluate perchlorate concentration trends northeast of the Olin site, we request continued monitoring and reporting on a quarterly basis of wells MP/PZ-1, MP/PZ-2, MP/PZ-3, MP/PZ-4, and MP/PZ-5.

SHALLOW AQUIFER INVESTIGATION

Water Board staff concurs with Olin's proposed additional characterization activities to evaluate the thickness of the shallow aquifer and assess the perchlorate distribution in the area between MW-21 and MW-40. We concur with the recommended boring locations as depicted in Figure 10.1 of the 2006 Characterization Report. We understand that Olin will proceed with the shallow aquifer investigation in a phased approach. Therefore, Water Board requests an update of the ongoing investigation in each upcoming quarterly monitoring report.

INTERMEDIATE AQUIFER INVESTIGATION

Background: Olin does not propose additional investigation activities to further characterize the perchlorate distribution in the intermediate aquifer. Olin has collected numerous grab groundwater samples in the intermediate aquifer to evaluate the perchlorate distribution in groundwater. Additionally, Olin continues to collect perchlorate concentration data from numerous domestic supply wells screened in the intermediate aquifer on a quarterly basis.

Based on the data collected to date, Water Board staff concurs with Olin that delineation of perchlorate in the intermediate aquifer is nearly complete. However, Olin reports elevated concentrations of perchlorate in the upper intermediate aquifer in MW-21. As

shown on Figure 7.5, Olin reports perchlorate concentrations in MW-21-089 at 24 µg/L. Olin has not collected additional data to delineate perchlorate in the upper intermediate aquifer surrounding MW-21. On Figure 7.5, Olin reports perchlorate data for CPT-90-050 downgradient of MW-21; however, it appears that this grab groundwater sample is not representative of the upper intermediate aquifer because Olin collected the sample from 50 feet below ground surface, which is representative of the shallow aquifer.

Water Board Response: Olin is required to delineate the elevated perchlorate concentrations detected in the upper intermediate aquifer surrounding MW-21. The results of the investigation must be included in the next update to the Characterization Report.

PERCHLORATE FROM LOCAL CLUSTER IN AREA III

Background: Olin reports that a couple of local clusters of increasing perchlorate concentration trends in Area III suggest the presence of one or more local perchlorate sources. We agree that other sources of perchlorate may be contributing or may have contributed to the existing groundwater impacts observed at those locations. However, to date, Olin has not confirmed that other potential perchlorate sources are viable contributors to the detected groundwater impacts.

Water Board Response: At this time and until Olin presents data that another source(s) of perchlorate is a viable contributor to the detected groundwater impacts, we must consider Olin as solely responsible for any required investigation and implementation of any necessary remedial actions. We encourage Olin to continue to investigate all other potential sources of perchlorate to groundwater in the Llagas Subbasin.

CONCLUSIONS

Requirements for additional characterization activities, a Deep Aquifer Characterization Work Plan, and request for information are made pursuant to Section 13267 of the California Water Code. Pursuant to Section 13268 of the Water Code, a violation of a request made pursuant to Water Code Section 13267 may subject you to civil liability of up to $1,000 per day for each day in which the violation occurs.

The Central Coast Water Board needs the required information in order to ensure that perchlorate concentrations are fully characterized and monitored, and that the appropriate groundwater remedial actions are implemented. You are required to submit this information because available data indicates that the Olin site is a source of perchlorate. More detailed information is available in the Central Coast Water Board's public file on this matter.

Any person affected by this action of the Central Coast Water Board may petition the State Water Resources Control Board (State Water Board) to review the action in accordance with Section 13320 of the California Water Code and Title 23, California Code of Regulations, Section 2050. The petition must be received by the State Water

Board, Office of Chief Counsel, P. O. Box 100 Sacramento, 95812 within 30 days of the date of this order. Water Board staff will provide copies of the law and regulations applicable to filing petitions upon request.

We appreciate your continued cooperation and proactive approach to conduct additional site assessment activities. We look forward towards successful implementation of groundwater cleanup activities and completion of characterization activities. If you have any questions, please contact **Hector Hernandez at (805) 542-4641** or via e-mail at Hhernandez@waterboards.ca.gov, or Harvey Packard at (805) 542-4639.

Sincerely,

Roger W. Briggs
Executive Officer

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Enclosure:

cc via E-mail:

Ms. Lori Okun
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Olin Technical Contacts IPL

cc via U.S. Mail:

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